IN THE CLAIMS:

The text of all pending claims, (including withdrawn claims) is set forth below. Cancelled and not entered claims are indicated with claim number and status only. The claims as listed below show added text with <u>underlining</u> and deleted text with ~~strikethrough~~. The status of each claim is indicated with one of (original), (currently amended), (cancelled), (withdrawn), (new), (previously presented), or (not entered).

1.   (previously presented) An apparatus comparing an obtained first fingerprint with a preliminarily registered second fingerprint, and determining whether or not the fingerprints match each other, comprising:

a ridge relation obtaining unit obtaining relation of a ridge containing a vicinal feature point near a feature point to be checked in a matching process performed on the first and the second fingerprints to the ridge containing the feature point to be checked in the matching process; and

a matching unit performing the matching process by searching the second fingerprint containing the vicinal feature point near the feature point to be checked in the matching process for the relation of the ridge containing the vicinal feature point to the ridge containing the feature point to be checked in the matching process, and, wherein when said first and second fingerprints match in at least one of position, type, and direction of the vicinal feature points, it is determined that feature information of feature points to be checked contained in the first and the second fingerprints are same feature points.

2.   (previously presented) The apparatus according to claim 1, wherein information about the feature point has a format comprising an identifier assigned to each feature point and corresponding feature information about the feature point.

3.   (original) The apparatus according to claim 1, wherein when a number of ridges from the feature point to be checked to a ridge containing the vicinal feature point, and when feature information about the vicinal feature points matches in a predetermined range, it is determined that feature points to be checked contained in the first and the second fingerprints are same feature points.

4.   (previously presented) The apparatus according to claim 1, wherein
in said first and second fingerprint, when feature information about the vicinal feature points matches in a predetermined range, a number of ridges between the feature point to be checked and a ridge containing the vicinal feature point matches a value obtained by counting a number of ridges in an opposite direction from the feature point to be checked to the vicinal feature point, and a number of ridges between the feature point to be checked and a ridge containing the vicinal feature point matches a value obtained by counting a number of ridges in a direction from the feature point to be checked to the vicinal feature point, it is determined that feature points to be checked contained in the first and the second fingerprints are same feature points.

5.   (cancelled)

6.   (original) The apparatus according to claim 1, wherein
when said feature points to be checked match in position and direction in a predetermined range, but are different in type in said first and second fingerprints, a resultant matching level is low.

7.   (original) The apparatus according to claim 1, wherein
when said vicinal feature points match in position and direction in a predetermined range, but are different in type in said first and second fingerprints, a resultant matching level is low.

8.   (original) The apparatus according to claim 1, wherein
when said feature points to be checked are different in type in said first and second fingerprints, a matching process is performed by changing relation between ridges containing the feature points to be checked and ridges containing the vicinal feature points.

9.   (previously presented) An apparatus comparing an obtained first fingerprint with a preliminarily registered second fingerprint, and determining whether or not the fingerprints match each other, comprising:
a virtual feature point generation unit generating a virtual feature point by referring to first and second feature points;
a ridge relation obtaining unit obtaining relation of a ridge containing a virtual vicinal feature point near a feature point to be checked in a matching process performed on the first

and the second fingerprints to the ridge containing the feature point to be checked in the matching process; and

a matching unit performing the matching process by searching the second fingerprint containing the virtual vicinal feature point near the feature point to be checked in the matching process for the relation of the ridge containing the virtual vicinal feature point to the ridge containing the feature point in the first feature point to be checked in the matching process process and comparing vicinal feature points of the first and second fingerprints, and wherein when said first and second fingerprints match in at least one of position, type, and direction of the vicinal feature points, it is determined that feature information of feature points to be checked contained in the first and the second fingerprints are same feature points.

10. (previously presented) The apparatus according to claim 9, wherein
information about the virtual feature point has a format comprising an identifier assigned to each virtual feature point and corresponding feature information about the virtual feature point.

11. (original) The apparatus according to claim 9, wherein
when a number of ridges from the feature point to be checked to a ridge containing the virtual vicinal feature point, and when feature information about the virtual vicinal feature points matches in a predetermined range, it is determined that feature points to be checked contained in the first and the second fingerprints are same feature points.

12. (original) The apparatus according to claim 9, wherein
when said first and second fingerprints match in at least one of position, type, and direction of the virtual vicinal feature points, it is determined that feature information of feature points to be checked contained in the first and the second fingerprints are same feature points.

13. (original) The apparatus according to claim 9, wherein
when said feature points to be checked match in position and direction in a predetermined range, but are different in type in said first and second fingerprints, a resultant matching level is low.

14. (original) The apparatus according to claim 9, wherein
when said virtual vicinal feature points match in position and direction in a predetermined

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range, but are different in type in said first and second fingerprints, a resultant matching level is low.

15.   (original) The apparatus according to claim 9, wherein
said virtual feature point is generated by projecting an existing feature point to a vicinal ridge.

16.   (original) The apparatus according to claim 15, wherein
feature information about the virtual feature point is feature information about a feature point from which a virtual feature point is projected.

17.   (original) The apparatus according to claim 9, wherein
when said feature points to be checked are different in type in said first and second fingerprints, a matching process is performed by changing relation between ridges containing the feature points to be checked and ridges containing the vicinal feature points.

18.   (previously presented) An apparatus comparing an obtained first fingerprint with a preliminarily registered second fingerprint, and determining whether or not the fingerprints match each other, comprising:

a virtual feature point generation unit generating a virtual feature point by referring to first and second feature points;

a ridge relation obtaining unit obtaining relations of a ridge containing a vicinal feature point near a feature point, and a ridge containing the virtual vicinal point to be checked in a matching process performed on the first and the second fingerprints to the ridge containing the feature point to be checked in the matching process; and

a matching unit performing the matching process by searching the second fingerprint containing the vicinal feature point near the feature point to be checked in the matching process for the relation of the ridge containing the vicinal feature point to the ridge containing the feature point in the first feature point to be checked in the matching process, and performing the matching process by searching the second fingerprint containing the virtual vicinal feature point near the feature point to be checked in the matching process for the relation of the ridge containing the virtual vicinal feature point to the ridge containing the feature point in the first feature point to be checked in the matching process and comparing vicinal feature points of the first and second fingerprints, thereby determining whether or not the feature point to be checked

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is matching, and wherein when said first and second fingerprints match in at least one of position, type, and direction of the vicinal feature points, it is determined that feature information of feature points to be checked contained in the first and the second fingerprints are same feature points.

19.　(original)　The apparatus according to claim 18, wherein
when said feature point to be checked matches in position and direction in said first and second fingerprints in a predetermined range, but does not match in type, evaluation of a matching result is set low.

20.　(original)　The apparatus according to claim 18, wherein
when said vicinal feature point or said virtual feature point matches in position and direction in a predetermined range in the first and second fingerprints, but does not match in type, evaluation of a matching result is set low.

21.　(original)　The apparatus according to claim 20, wherein
a matching process is performed on a combination of the vicinal feature point of said first and second fingerprint and the virtual feature point.

22.　(original)　The apparatus according to claim 18, wherein
when said first and second fingerprints match in feature points to be checked and said vicinal feature points match several times for the feature points to be checked, evaluation of a matching result is enhanced depending on a number of matching results.

23.　(previously presented)　A method for comparing an obtained first fingerprint with a preliminarily registered second fingerprint, and determining whether or not the fingerprints match each other, comprising:
(a) obtaining relation of a ridge containing a vicinal feature point near a feature point to be checked in a matching process performed on the first and the second fingerprints to the ridge containing a feature point to be checked in the matching process; and
(b) performing the matching process by searching the second fingerprint containing the vicinal feature point near the feature point to be checked in the matching process for the relation of the ridge containing the vicinal feature point to the ridge containing the feature point in the first feature point to be checked in the matching process and comparing vicinal feature points of the

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first and second fingerprints, and wherein when said first and second fingerprints match in at least one of position, type, and direction of the vicinal feature points, it is determined that feature information of feature points to be checked contained in the first and the second fingerprints are same feature points.

24. (original) The method according to claim 23, wherein

information about the feature point has a format comprising an identifier assigned to each feature point and corresponding feature information about the feature point.

25. (original) The method according to claim 23, wherein

when a number of ridges from the feature point to be checked to a ridge containing the vicinal feature point, and when feature information about the vicinal feature points matches in a predetermined range, it is determined that feature points to be checked contained in the first and the second fingerprints are same feature points.

26. (previously presented) The method according to claim 23, wherein

in said first and second fingerprint, when feature information about the vicinal feature points matches in a predetermined range, a number of ridges between the feature point to be checked and a ridge containing the vicinal feature point matches a value obtained by counting a number of ridges in an opposite direction from the feature point to be checked to the vicinal feature point, and a number of ridges between the feature point to be checked and a ridge containing the vicinal feature point matches a value obtained by counting a number of ridges in a direction from the feature point to be checked to the vicinal feature point, it is determined that feature points to be checked contained in the first and the second fingerprints are same feature points.

27. (original) The method according to claim 23, wherein

when said first and second fingerprints match in at least one of position, type, and direction of the vicinal feature points, it is determined that feature information of feature points to be checked contained in the first and the second fingerprints are same feature points.

28.   (original) The method according to claim 23, wherein

when said feature points to be checked match in position and direction in a predetermined range, but are different in type in said first and second fingerprints, a resultant matching level is low.

29.   (original) The apparatus according to claim 23, wherein

when said vicinal feature points match in position and direction in a predetermined range, but are different in type in said first and second fingerprints, a resultant matching level is low.

30.   (original) The apparatus according to claim 23, wherein

when said feature points to be checked are different in type in said first and second fingerprints, a matching process is performed by changing relation between ridges containing the feature points to be checked and ridges containing the vicinal feature points.

31.   (previously presented) A method for comparing an obtained first fingerprint with a preliminarily registered second fingerprint, and determining whether or not the fingerprints match each other, comprising:

(a) generating a virtual feature point by referring to first and second feature points;

(b) obtaining the relation of a ridge containing a virtual vicinal feature point near a feature point to be checked in a matching process performed on the first and the second fingerprints to the ridge containing the feature point to be checked in the matching process; and

(c) performing the matching process by searching the second fingerprint containing the virtual vicinal feature point near the feature point to be checked in the matching process for a relation of the ridge containing the virtual vicinal feature point to the ridge containing the feature point in the first feature point to be checked in the matching process and comparing vicinal feature points of the first and second fingerprints, and wherein when said first and second fingerprints match in at least one of position, type, and direction of the vicinal feature points, it is determined that feature information of feature points to be checked contained in the first and the second fingerprints are same feature points.

32.   (previously presented) The method according to claim 31, wherein

information about the virtual feature point has a format comprising an identifier assigned to each virtual feature point and corresponding feature information about the virtual feature point.

33.   (original) The method according to claim 31, wherein

when a number of ridges from the feature point to be checked to a ridge containing the virtual vicinal feature point, and when feature information about the virtual vicinal feature points matches in a predetermined range, it is determined that feature points to be checked contained in the first and the second fingerprints are same feature points.

34.   (original) The method according to claim 31, wherein

when said first and second fingerprints match in at least one of position, type, and direction of the virtual vicinal feature points, it is determined that feature information of feature points to be checked contained in the first and the second fingerprints are same feature points.

35.   (original) The method according to claim 31, wherein

when said feature points to be checked match in position and direction in a predetermined range, but are different in type in said first and second fingerprints, a resultant matching level is low.

36.   (original) The method according to claim 31, wherein

when said virtual vicinal feature points match in position and direction in a predetermined range, but are different in type in said first and second fingerprints, a resultant matching level is low.

37.   (original) The method according to claim 31, wherein

said virtual feature point is generated by projecting an existing feature point to a vicinal ridge.

38.   (original) The method according to claim 37, wherein

feature information about the virtual feature point is feature information about a feature point from which a virtual feature point is projected.

39.   (original) The method according to claim 17, wherein

when said feature points to be checked are different in type in said first and second fingerprints, a matching process is performed by changing relation between ridges containing the feature points to be checked and ridges containing the vicinal feature points.

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40.   (previously presented) A method for comparing an obtained first fingerprint with a preliminarily registered second fingerprint, and determining whether or not the fingerprints match each other, comprising:

(a) generating a virtual feature point by referring to first and second feature points;

(b) obtaining relations of a ridge containing a vicinal feature point near a feature point to be checked, and a ridge containing a virtual vicinal point to be checked in a matching process performed on the first and the second fingerprints to the ridge containing the feature point to be checked in the matching process; and

(c) performing the matching process by searching the second fingerprint containing the vicinal feature point near the feature point to be checked in the matching process for the relation of the ridge containing the vicinal feature point to the ridge containing the feature point in the first feature point to be checked in the matching process, and performing the matching process by searching the second fingerprint containing the virtual vicinal feature point near the feature point to be checked in the matching process for the relation of the ridge containing the virtual vicinal feature point to the ridge containing the feature point in the first feature point to be checked in the matching process and comparing vicinal feature points of the first and second fingerprints, thereby determining whether or not the feature point to be checked is matching, and wherein when said first and second fingerprints match in at least one of position, type, and direction of the vicinal feature points, it is determined that feature information of feature points to be checked contained in the first and the second fingerprints are same feature points.

41.   (original) The method according to claim 40, wherein
when said feature point to be checked matches in position and direction in said first and second fingerprints in a predetermined range, but does not match in type, evaluation of a matching result is set low.

42.   (original) The method according to claim 40, wherein
when said vicinal feature point or said virtual feature point matches in position and direction in a predetermined range in the first and second fingerprints, but does not match in type, evaluation of a matching result is set low.

43.   (original) The method according to claim 42, wherein

a matching process is performed on a combination of the vicinal feature point of said first and second fingerprint and the virtual feature point.

44.   (original) The method according to claim 40, wherein

when said first and second fingerprints match in feature points to be checked and said vicinal feature points match several times for the feature points to be checked, evaluation of a matching result is enhanced depending on a number of matching results.

45.   (previously presented) A computer-readable storage medium storing a program for directing a computer to realize a method for comparing an obtained first fingerprint with a preliminarily registered second fingerprint, and determining whether or not the fingerprints match each other, comprising:

(a) obtaining relation of a ridge containing a vicinal feature point near a feature point to be checked in a matching process performed on the first and the second fingerprints to the ridge containing a feature point to be checked in the matching process; and

(b) performing the matching process by searching the second fingerprint containing the vicinal feature point near the feature point to be checked in the matching process for the relation of the ridge containing the vicinal feature point to the ridge containing the feature point in the first feature point to be checked in the matching process and comparing vicinal feature points of the first and second fingerprints, and wherein when said first and second fingerprints match in at least one of position, type, and direction of the vicinal feature points, it is determined that feature information of feature points to be checked contained in the first and the second fingerprints are same feature points.

46.   (previously presented) A computer-readable storage medium storing a program for directing a computer to realize a method for comparing an obtained first fingerprint with a preliminarily registered second fingerprint, and determining whether or not the fingerprints match each other, comprising:

(a) generating a virtual feature point by referring to first and second feature points;

(b) obtaining a relation of the ridge containing a virtual vicinal feature point near a feature point to be checked in a matching process performed on the first and the second fingerprints to the ridge containing the feature point to be checked in the matching process; and

(c) performing the matching process by searching the second fingerprint containing the virtual vicinal feature point near the feature point to be checked in the matching process for the relation of the ridge containing the virtual vicinal feature point to the ridge containing the feature point in the first feature point to be checked in the matching process and comparing vicinal feature points of the first and second fingerprints, and wherein when said first and second fingerprints match in at least one of position, type, and direction of the vicinal feature points, it is determined that feature information of feature points to be checked contained in the first and the second fingerprints are same feature points.

47.   (previously presented) A computer-readable storage medium storing a program for directing a computer to realize a method for comparing an obtained first fingerprint with a preliminarily registered second fingerprint, and determining whether or not the fingerprints match each other, comprising:

(a) generating a virtual feature point by referring to first and second feature points;

(b) obtaining relations of a ridge containing a vicinal feature point near a feature point to be checked, and a ridge containing a virtual vicinal point to be checked in a matching process performed on the first and the second fingerprints to the ridge containing the feature point to be checked in the matching process; and

(c) performing the matching process by searching the second fingerprint containing the vicinal feature point near the feature point to be checked in the matching process for the relation of the ridge containing the vicinal feature point to the ridge containing the feature point in the first feature point to be checked in the matching process, and performing the matching process by searching the second fingerprint containing the virtual vicinal feature point near the feature point to be checked in the matching process for the relation of the ridge containing the virtual vicinal feature point to the ridge containing the feature point in the first feature point to be checked in the matching process and comparing vicinal feature points of the first and second fingerprints, thereby determining whether or not the feature point to be checked is matching, and wherein when said first and second fingerprints match in at least one of position, type, and direction of the vicinal feature points, it is determined that feature information of feature points to be checked contained in the first and the second fingerprints are same feature points.

48.   (previously presented) A method of comparing first and second fingerprints, comprising:

identifying feature points of the first and second fingerprints in fingerprint ridges;

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comparing feature point information of a target feature point of a ridge of the first fingerprint with a corresponding feature point of a ridge in the second finger print where the feature point information compared includes position, type and direction;

comparing the feature point information of feature points neighboring the target and corresponding feature points in corresponding ridges, respectively, in the first and section fingerprints; and

determining whether there is a match between the first and second feature points responsive to the comparisons with a match existing when there is a match in one of the position, type and direction in vicinal feature points.

49.   (cancelled)

50.   (new) A method of comparing first and second fingerprints, comprising:

identifying vicinal feature points of the first and second fingerprints in fingerprint ridges;

comparing position, type and direction of a target vicinal feature point in the first fingerprint with position, type and direction of a corresponding feature point in the second fingerprint; and

determining whether there is a match between the first and second vicinal feature points responsive to the comparison.

51.   (new) A method as recited in claim 50, wherein a match exists when there is a match in the comparisons of one of the position, type and direction.